

Remarks/Arguments:

The pending claims are 1-36. Claims 10, 14, 15 and 20 have been amended to make them consistent with claim 1. Claims 28-36 have been added. No new matter has been added.

Paragraph 1 of the Office Action states that the Information Disclosure Statement filed on June 15, 2006 does not comply with various sections of 37 CFR and with the MPEP because, in the view of the PTO, "the last US reference has the wrong number." The Examiner has drawn a line through the last reference on the Form PTO/SB/08a that was submitted with the June 15, 2006 Information Disclosure Statement. The aforesaid last reference is identified on the form as US 6,734,467 B2, published 5/11/2004, by Schlereth et al. Applicants attach hereto a copy of the face page of the '467 patent showing that the '467 patent was correctly identified on the form. Accordingly, Applicants herein respectfully submit that the Schlereth reference was correctly identified in the June 15, 2006 Information Disclosure Statement, that Applicants are therefore not required to re-submit the Schlereth reference on a new Information Disclosure Statement, and that the Schlereth should now be considered on the merits without any additional requirements by Applicants herein.

In paragraph 3 of the Office Action, claims 1-6 have been rejected under 35 U.S.C. § 102(b) as anticipated by Singer et al. (U.S. Patent No. 5,813,752). The rejection is respectfully traversed. Claim 1 recites, in part:

...an optic device configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device.

Without designating the element(s) considered to be an "optic device" in Singer, the Office Action states that Singer discloses the kind of optic device recited in claim 1. That is, the Office Action contends that Singer has "an optic device configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device." Assuming the Office Action intends to correlate short wavepass filter (SWP) 30 of Singer to the optic device recited in claim 1, Applicants disagree.

Fig. 1 of Singer shows a wavy arrow indicating light emitted by LED 16 to phosphor layer 32. (col. 3, lines 34-37) Light impacting phosphor layer 32 is then emitted in a

backward direction from phosphor layer 32 as shown by the downward facing lines emanating from phosphor layer 32 into filter layer 30. (col. 3, lines 41-42). Applicants assume the Office Action intends to correlate Singer's backward emitted light to Applicants' backward transmitted light. Singer's backward emitted light impinges on filter layer 30 which converts the backward emitted light into forward facing light by reflecting the backward emitted light in a forward direction, as indicated by the upward facing straight arrows coming out of filter layer 30. Singer shows that the reflected forward facing light impinges on phosphor layer 32 and then exits phosphor layer 32. (col. 3, lines 42-44).

Singer's description shows that the Singer device does not operate in the same way as the embodiment of Applicants' invention recited in claim 1. Claim 1 recites that the optic device is "configured to receive the backward transmitted light and transfer the backward transmitted light outside the optic device." Singer does not transfer backward transmitted light outside the optic device. In Singer, the light that is emitted backward from phosphor 32 is not transferred outside of the filter layer 30. Instead of filter layer 30 being configured to transfer the backward emitted light outside of the optic device, the filter layer 30 is configured to maintain the backward emitted light within itself so that it can reflect the received light in the same forward direction as the original light (depicted by the wavy arrow). That is, the filter layer 30 is configured to convert the backward emitted light into reflected forward facing light, not to transfer the backward emitted light out of filter layer 30.

The differences between the operation of Singer and the operation of the device recited in claim 1 are substantial. Referring to Applicants' Fig. 6, for example, it is seen that optic device 606 is "configured to receive the backward transmitted light" from phosphor layer 604 and "transfer the backward transmitted light outside the optic device." In contrast, Singer not only converts light that is backward emitted from phosphor layer 32 into reflected forward facing light, the reflected forward facing light again impacts phosphor layer 32, necessarily resulting in some of the second impact light again being backward emitted toward filter layer 30 which again reflects it toward the phosphor layer and so on, thereby losing efficiency. Applicants' claimed device is therefore much more efficient than the Singer device. That is, Applicants' claimed device is able to extract photons before they undergo multiple reflections within the package. (page 18, lines 25-26).

Accordingly, claim 1 and its dependent claims 2-6 are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Singer for at least the above reasons.

Claim 5, dependent from claim 1, recites "the optic device includes at least one of a lens or a light guide having a light transmissive property." Page 3 of the Office Action contends that element 34 in Singer anticipates this recitation. Applicants respectfully disagree. In Singer, element 34 is a lens. (col. 3, line 4). The optic device recited in claim 1, however, is "configured to receive the backward transmitted light and transfer the backward transferred light outside of the optic device." Singer's lens 34 is not configured to perform either of these functions. First, as indicated above, it is Singer's filter layer 30 that receives backward emitted light from phosphor 32. Singer's lens 34 does not receive backward emitted light from phosphor 32. Since Singer's lens does not perform this function, it also cannot perform the function of "transfer[ing] the backward transmitted light outside of the optic device." Accordingly, at least for these additional reasons, claim 5 is not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Singer.

New claim 28 recites that the optic device is configured to "transfer substantially all of the backward transmitted light outside of the optic device." (emphasis added). This recitation is supported at least by page 17, lines 11-13, 17-21; page 18, lines 11-12, 23-26; page 19, lines 9-13. Singer does not disclose that any of the backward emitted light from phosphor layer 32 is transferred out of filter layer 30. Instead, Singer discloses that all of the backward emitted light is maintained in filter layer 30 which causes the light to be reflected forward. Therefore, Singer does not disclose that "substantially all of the backward transmitted light" is transferred outside the optic device. Accordingly, claim 28 is not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Singer for at least these reasons.

New claim 29 recites that "at least approximately 84% of the combined transmitted light and backward transmitted light is transferred outside of the optic device." This claim is supported at least by page 11, lines 24-30. Since this claim depends from claim 28, it is not subject to rejection over the cited art at least for the same reasons that claim 28 is not subject to rejection.

New claim 30 recites that the optic device is configured to transfer backward transmitted light outside of the optic device "between the source of light and the down

conversion material." This recitation is supported at least by Applicants' Figs. 6, 7, and 13 and by page 17, lines 11-21; page 18, lines 23-26. These features are not shown in Singer. Instead, the forward facing light in Singer is transmitted through phosphor layer 32. Accordingly, claim 30 is not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Singer for at least these reasons.

New claim 31 is similar to claim 1. Claim 31 is therefore not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Singer for at least the same reasons that claim 1 is not subject to that rejection. In addition, claim 31 recites that the optic device is configured to "avoid transferring substantially all of the backward transmitted light into the source of light." New claim 32, dependent from claim 31, recites that the optic device is configured to "avoid transferring substantially all of the backward transmitted light into the down conversion material." The recitations in claims 31 and 32 are supported at least by Figs. 6 and 13; page 17, lines 11-13, 17-21; page 18, lines 11-12, 23-26. Singer does not show that its filter 30 is configured to "avoid transferring substantially all of the backward transmitted light into the light source" and to "avoid transferring substantially all of the backward transmitted light into the down conversion material." Instead, Singer shows that its filter 30 is configured only to convert backward emitted light from phosphor layer 32 into forward facing light that impacts phosphor layer 32. Accordingly, claims 31 and 32 are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Singer for at least these additional reasons.

In paragraph 7 of the Office Action, claims 18 and 19 (which both depend from claim 1) have been rejected under 35 U.S.C. § 103(a) as unpatentable over Singer in view of Kano et al. (U.S. Patent No. 3,875,456). In paragraph 8 of the Office Action, claim 11 (also dependent from claim 1) has been rejected as unpatentable over Singer in view of Iwasa et al. (U.S. Publication No. 2002/0047516). The rejections are respectfully traversed. Neither Kano nor Iwasa disclose all of the features recited in claim 1 nor the features that are missing in Singer. Therefore, even if the features of Singer and Kano were combined, or if the features of Singer and Iwasa were combined, neither combination would have all of the features recited in claim 1. Accordingly, neither claim 1 nor dependent claims 18 and 19, nor dependent claim 11 are subject to rejection 35 U.S.C. § 103(a) as unpatentable over Singer in view of Kano or in view of Iwasa, respectively.

In paragraph 4 of the Office Action, claims 1, 7-10 and 12-17 have been rejected under 35 U.S.C. § 102(b) as anticipated by Broer (U.S. Patent No. 6,210,012). The rejection is respectfully traversed. As indicated above, claim 1 recites, in part:

. . . an optic device configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device.

The Office Action contends that Broer discloses "an optic device (3 and 9) configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device." Applicants disagree.

Broer does not disclose an optic device that is configured to act on light that might be backward transmitted from its down conversion material 5. Instead, Broer discloses responses to light that is reflected by polarizer 9 and that is reflected by the wall of lamp housing 3. (see, e.g., col. 3, lines 14-23). More specifically, in Broer, radiation from lamp 2 is polarized by reflective polarizer 9, which passes one type of polarized light and reflects light that is polarized in the other direction. (col. 3, lines 14-18). The light reflected from polarizer 9 is then further reflected by the wall of lamp housing 3. (col. 3, lines 18-20). The wall of lamp housing 3 is adapted to impart the correct direction of polarization to the light so that it can then be passed by polarizer 9. (col. 3, lines 20-23). There is no disclosure in Broer that the light that eventually exits from waveguide 4 (see arrow 12) is light that has been backward transferred from down conversion material 5.

Furthermore, light that is backward reflected from polarizer 9 does not exit polarizer 9. Instead, light that has been back reflected from polarizer 9 impinges on the wall of lamp housing 3 which converts the back reflected light into forward reflected light. Instead of polarizer 9 being configured to transfer its back reflected light outside of its device, polarizer 9 is configured to keep the light within the device so that the wall of lamp housing 3 can reflect the light again. That is, polarizer 9 is configured to convert light from light source 2 into back reflected light (not light from down conversion material 5) and the wall of lamp housing 3 is configured to convert the back reflected light into reflected forward facing light, and it is this forward facing light that is transmitted through polarizer 9 and out of waveguide 4.

Broer is much less efficient than Applicants' claimed device because the light in Broer must reflect twice: one reflection from polarizer 9 and a second reflection from the wall of lamp housing 3. Instead, referring to Applicants' Fig. 6, for example, it is seen that optic device 606 is "configured to receive the backward transmitted light" from the phosphor layer 604 and "transfer the backward transmitted light outside the optic device." That is, Applicants' claimed device is able to extract photons before they undergo multiple reflections within the package. (page 18, lines 25-26).

Accordingly, at least for the above reasons, claims 1, 7-10, and 12-17 are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Broer.

Broer also does not disclose the features recited in new claims 28-32. Because Broer is designed to provide multiple reflections within the device, it is not configured to "transfer substantially all of the backward emitted light outside of the optic device" as recited in claim 28; it is not designed to transmit light "outside of the optic device between the source of light and the down conversion material" as recited in claim 30; and it does not disclose the features in claims 31 and 32 because multiple reflections in the device, in combination with wall 3 and polarizer 9, cause light to impact its lamp 2 and its down conversion material 5. Accordingly, claim 28-32 are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Broer for at least these reasons.

Additionally, claim 7 recites, in part, that "the optic device includes . . . a light guide for directing substantially all of the light transmitted from the source toward the down conversion material." The Office Action contends that the part of the optic device that serves as a light guide is reflector 3, which, according to the Office Action is for "directing substantially all of the light emitted from the source toward the down conversion material (Fig. 1)." Applicants disagree. Broer discloses that only the radiation which is correctly polarized passes through polarizer 9 while radiation that is polarized differently is reflected by polarizer 9. Only after the radiation reflected by polarizer 9 is again reflected by the wall of lamp housing 3 is it directed toward down conversion material 5. Therefore, there is no disclosure in Broer that "substantially all of the light emitted from the source" is directed toward the down conversion material by the wall of lamp housing 3 (emphasis added). Broer discloses that a substantial part of the light that impacts down conversion material 5 is light reflected from the wall of

lamp housing 3, and not light from light source 2. Accordingly, for at least this additional reason, claim 7 is not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Broer.

Claims 14 and 15 have been amended to recite that a collecting device such as a reflector acts upon "backward transmitted light which has been transferred out of the optic device." The Office Action contends that the reflective aspect of wall 3, in combination with waveguide 4, corresponds to the collecting device and the reflector. Neither of those elements of Broer collect backward transmitted light which "has been transferred out of the optic device." Accordingly, for at least these additional reasons, amended claims 14 and 15 are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Broer.

In paragraph 5 of the Office Action, claims 20-25 have been rejected under 35 U.S.C. § 102(b) as anticipated by Iwasa et al.

Claim 20 has been amended to recite the light transmissive material of the optic comprises "at least two separate segments" (supported at least by page 11, lines 19-20); "at least one light radiation source disposed adjacent an end" of the optic (supported at least by page 12, lines 2-3 and Fig. 3); and "a down conversion material disposed along a longitudinal axis within" the optic (supported at least by page 10, lines 14-16). Claim 20, as amended, is not anticipated by Iwasa. The device in Iwasa comprises a single tube 1, not "at least two separate segments;" Fig. 1 of Iwasa shows that its LEDs 3 are away from an end of the tube and not "disposed adjacent an end" of the tube; and the fluorescent layer 20 in Iwasa is applied to the wall of the tube 18, rather than "disposed along a longitudinal axis within" the tube. See, Iwasa, para. [0091] and Fig. 3A. Accordingly, for at least these reasons claim 20 and dependent claims 21-25 are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Iwasa.

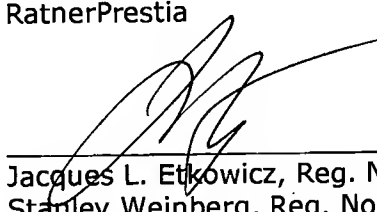
New claims 33-36, depending from amended claim 20, are supported on page 10, lines 13-16, page 10, line 31-page 11, line 4 and Figs. 2 and 3. These claims are not subject to rejection under 35 U.S.C. § 102(b) as anticipated by Iwasa et al. for at least the same reasons that amended claim 20 is not subject to the rejection. In addition, the features recited in these claims are also not shown in Iwasa and for these additional reasons, therefore, they are not subject to the rejection.

In paragraph 9 of the Office Action, claims 26 and 27 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Iwasa. Claim 26 recites that "the light radiation source includes at least one light source on each side of the down conversion material." The Office Action admits that "Iwasa does not disclose at least one light source on each side of the down conversion material." Nevertheless, the Office Action contends that "[p]utting at least one light source on each side of the down conversion material is considered to be an obvious variation." Applicants respectfully disagree. Iwasa discloses LEDs placed along the longitudinal axis of the tube 1 and a fluorescent layer applied to an inner surface of the tube (paras. [0082], [0091]) or to an outer surface of the tube (para. [0092]). There is no disclosure or suggestion in Iwasa that would allow the positions of the down conversion material and the LEDs to be changed so that there could be "at least one light source on each side of the down conversion material." Accordingly, for at least this additional reason, claim 26, and its dependent claim 27, are not subject to rejection under 35 U.S.C. § 103(a) as unpatentable over Iwasa.

For all of the above reasons, claims 1-36 are now in condition for allowance and a notice of allowance is respectfully requested.

Respectfully submitted,

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Attachment: Copy of the face page of US 6,734,467 B2

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